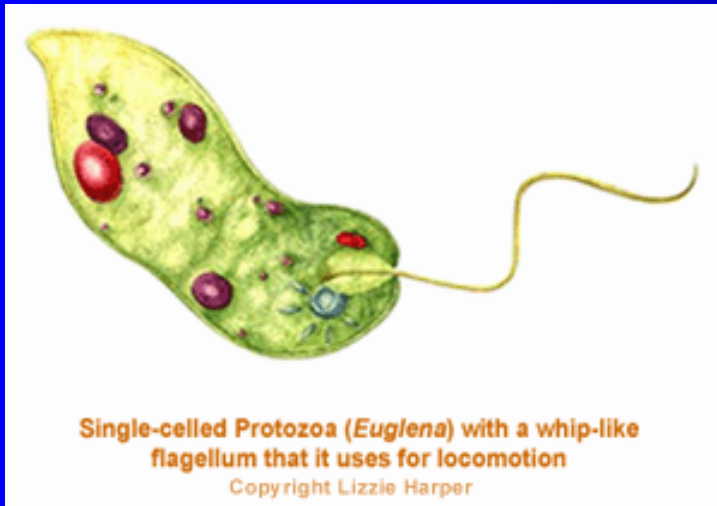
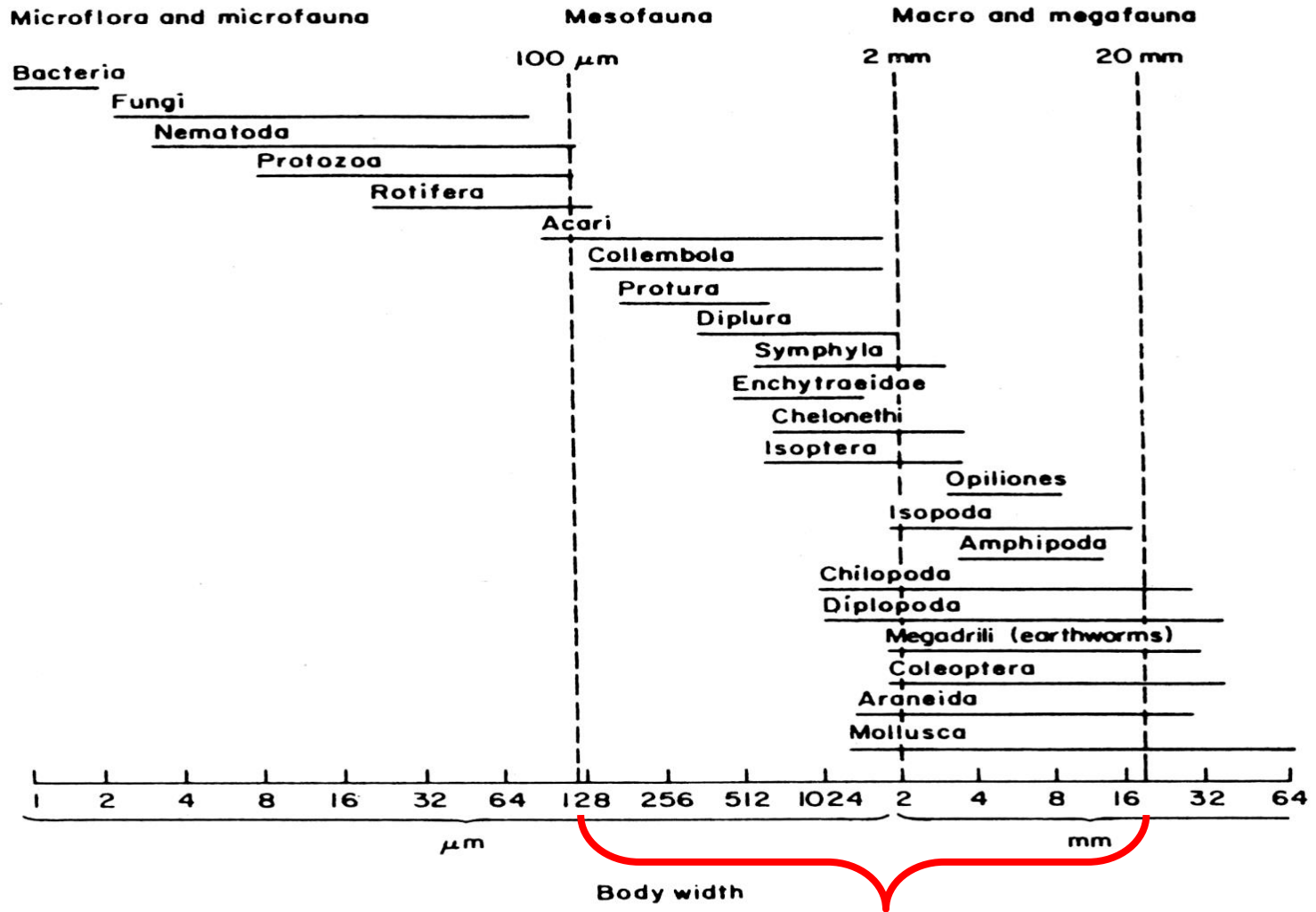


# Soil Fauna





**FIGURE 4.3** Size classification of organisms in decomposer food webs by body width (Swift *et al.*, 1979).

# Soil Fauna

- includes animals that usually spend one or more active periods entirely in the soil or organic litter layer
- Organisms using soil during their passive periods (eggs, cysts or pupae or dormancy) are not included in this group

**Earthworms, nematodes, mites, collembole spend their entire life cycle in the soil**

# Classification of soil fauna

- Time to spend in the ground
- Movement characteristics
- Nutrition behaviours,
- Nesting characteristics
- Sizes

## Soil fauna according to size

- 1) **Micro fauna:** organisms smaller than 200 microns, such as protozoans, but visible with a microscope.
- 2) **Mesofauna:** Animals 200  $\mu\text{m}$  - 10 mm in size. Most of the nematodes, rotifers and members belonging to various groups are found in this group.
- 3) **Macrofauna:** Animals that can be measured in cm, earthworms, snails and arthropod groups and some vertebrates.
- 4) **Megafauna:** Some mammals that live in the soil.

# Habitate Preferences

- Moist film surfaces around water-filled pores and aggregates, (aquatic microenvironments)
- Cavities and big pores in soil (terrestrial microenvironment)

# Nutritional Characteristics

- Fauna can feed on living organisms (**biophagous**)
- Fauna can feed on dead tissue (**saprohagous**)

# Fauna according to their motion

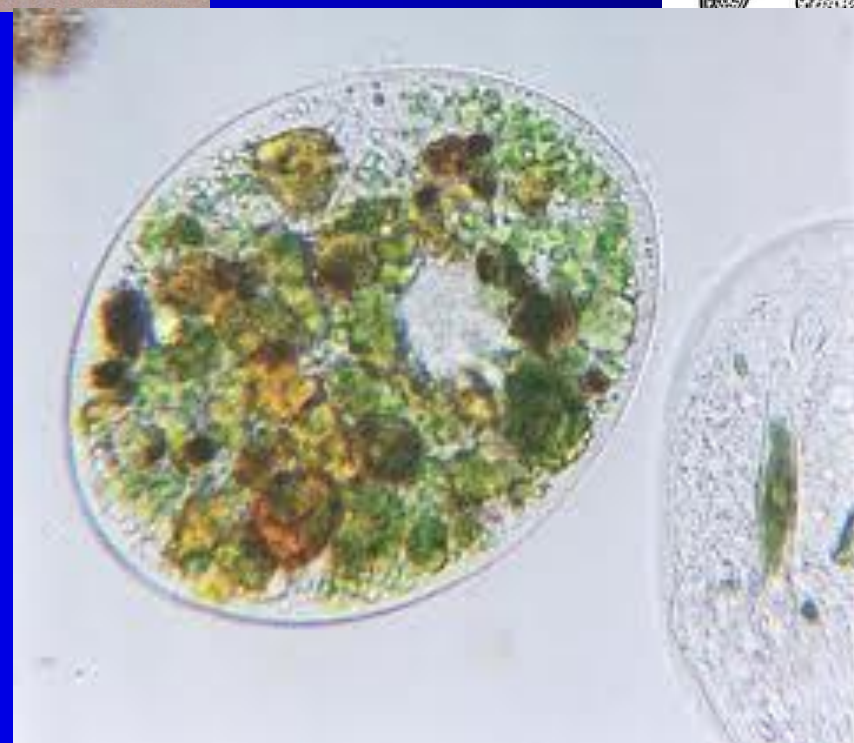
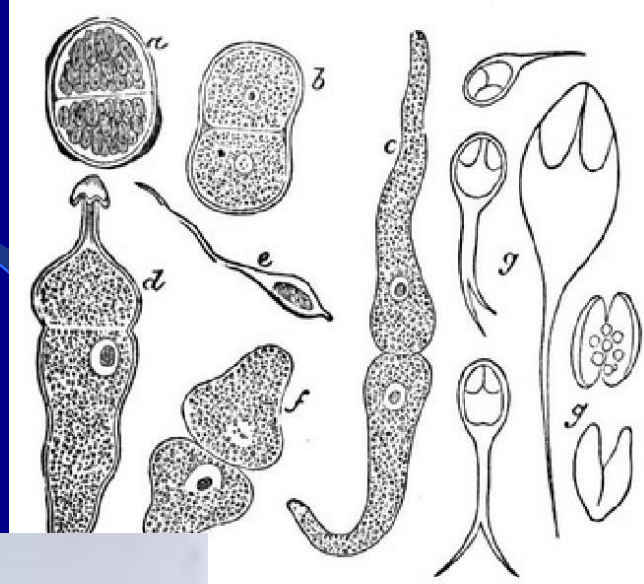
1. Active soil digging organisms (makes channels and galleries to move in soil)
2. Non-digging organisms (use soil pore system or existing channels to move).



# Protozoa (Protists)

- Single-celled, mostly non-photosynthetic, eukaryotic organisms defined as high protists
- They move by using organ-like cell parts called organelles.
- They thrive in the water film layer around soil clumps, in pores partially filled with water.
- Under unfavorable environmental conditions, such as drought, they form durable forms called "syst" (cyst).

# Protozoa



© Belinda J Mooney & Licensors

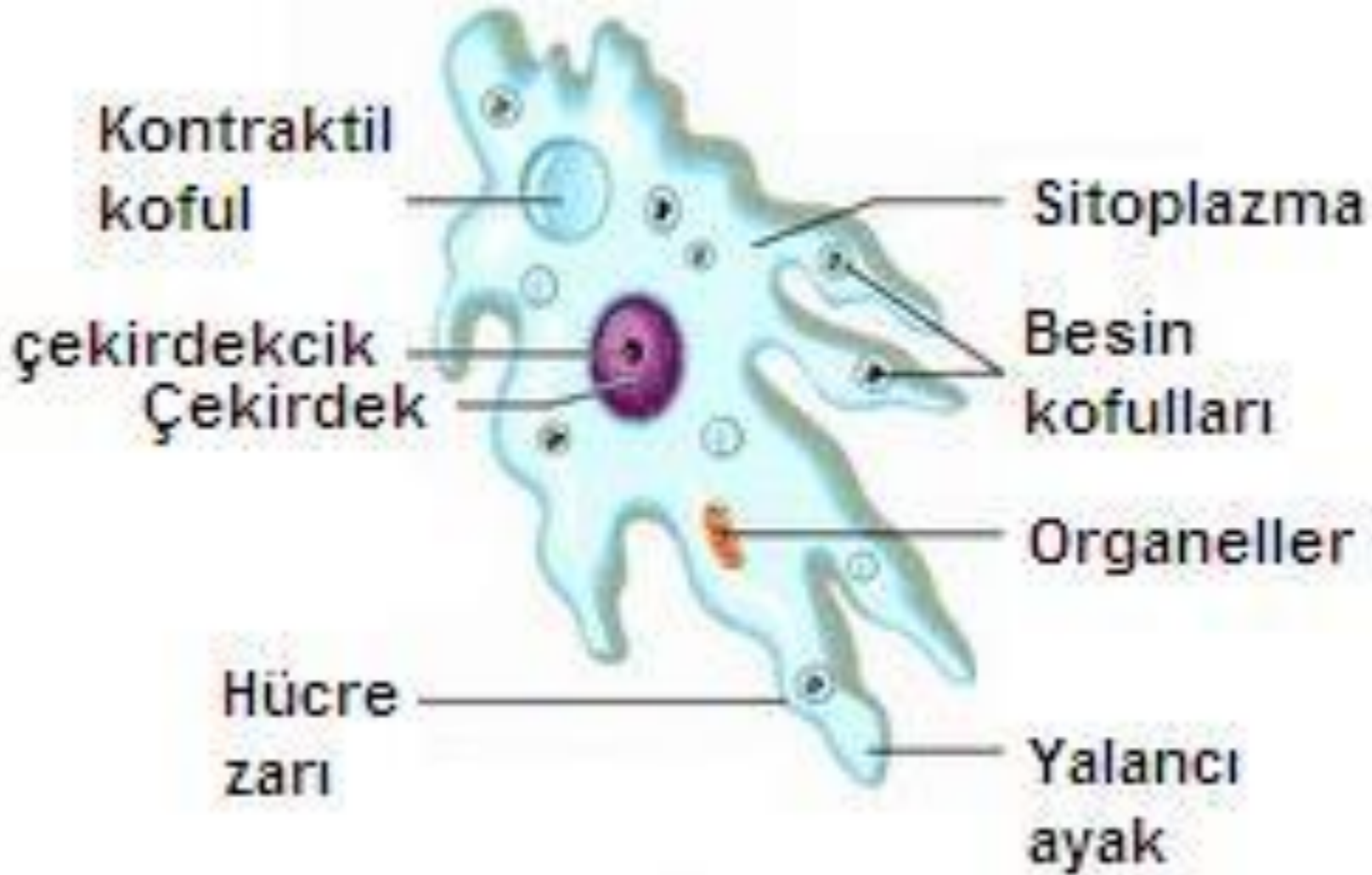
# Nutrition

- Most of the protozoa show heterotrophic nutrition.
- They generally feed on algae, bacteria and small forms of their own genus.
- Autotrophic green protozoa can form symbiosis with green algae.
- Protozoa infections are the causes of many animal and human diseases.

# Functions

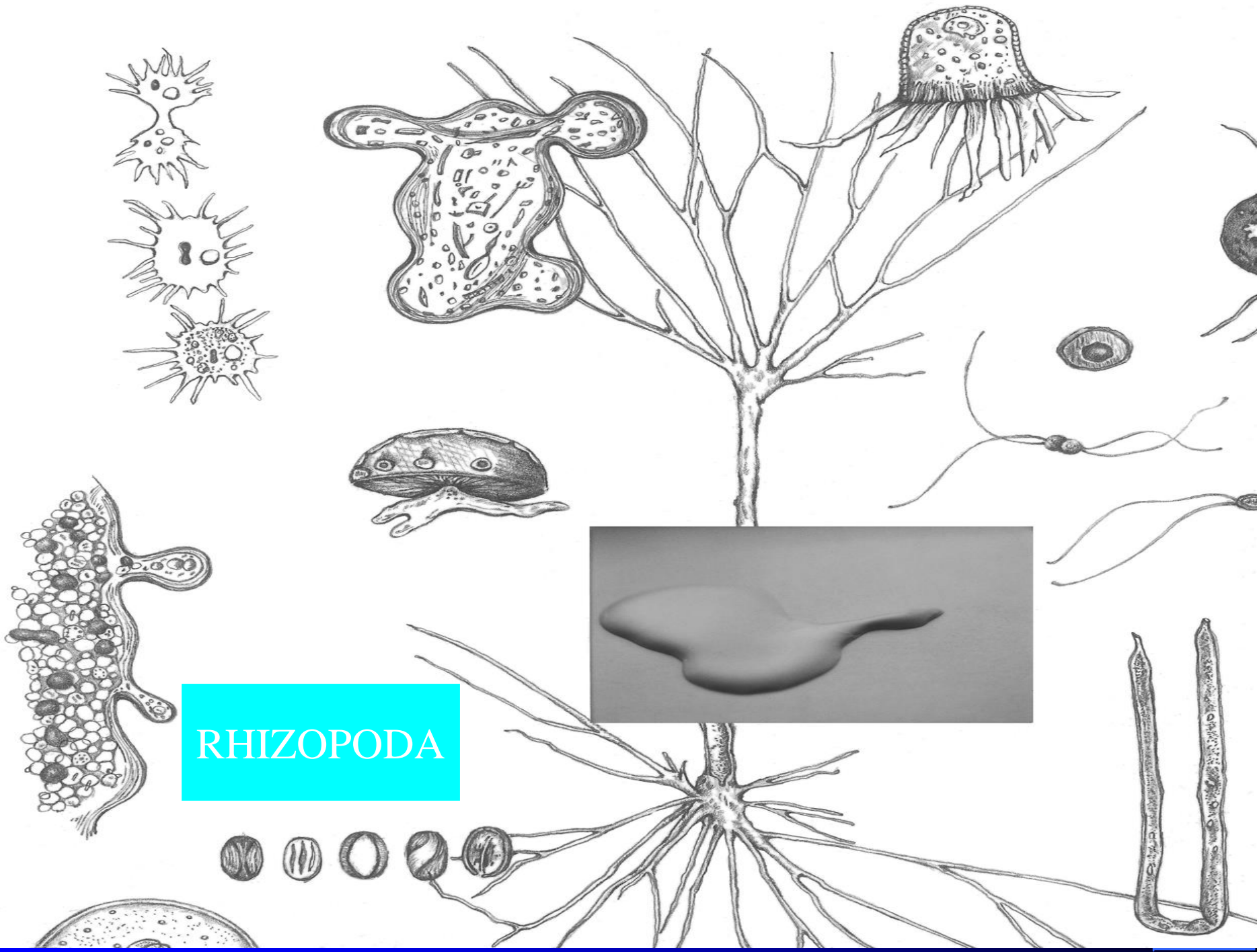
- Protozoa such as infusoria and amoeba feed on bacteria, (supressing bacterial populations in the soil)
- Protozoa activities are beneficial for pathogenic bacteria.
- The predatory effect of these organisms on bacteria enables the nutrients in bacterial biomass to participate organic matter cycle rapidly.

## A ) Amoeba and Rhizopoda



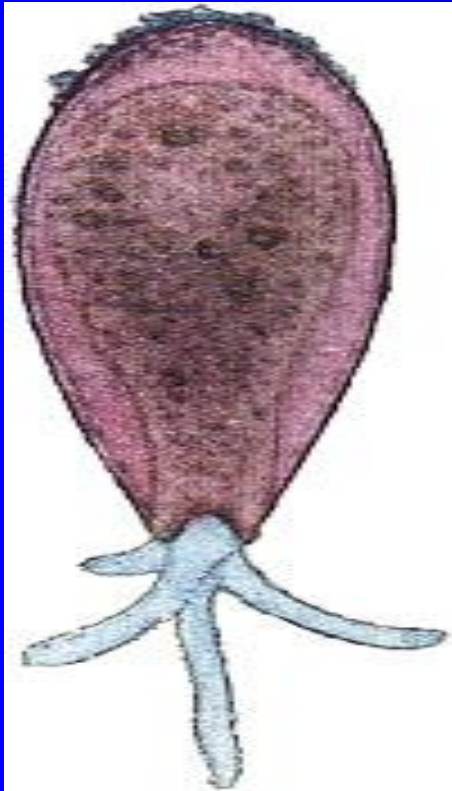
# Amoeba and Rhizopoda

- These organisms move with finger-like formations of the cytoplasm and are therefore described as creeping protozoans (Rhizopoda)
- Their reproductive system is based on Segmentation
- They have no obvious shapes.
- Bacterial size and surface (physical and chemical) qualities and pigment formation are important factors effecting amoebas predatory behaviours on bacteria.

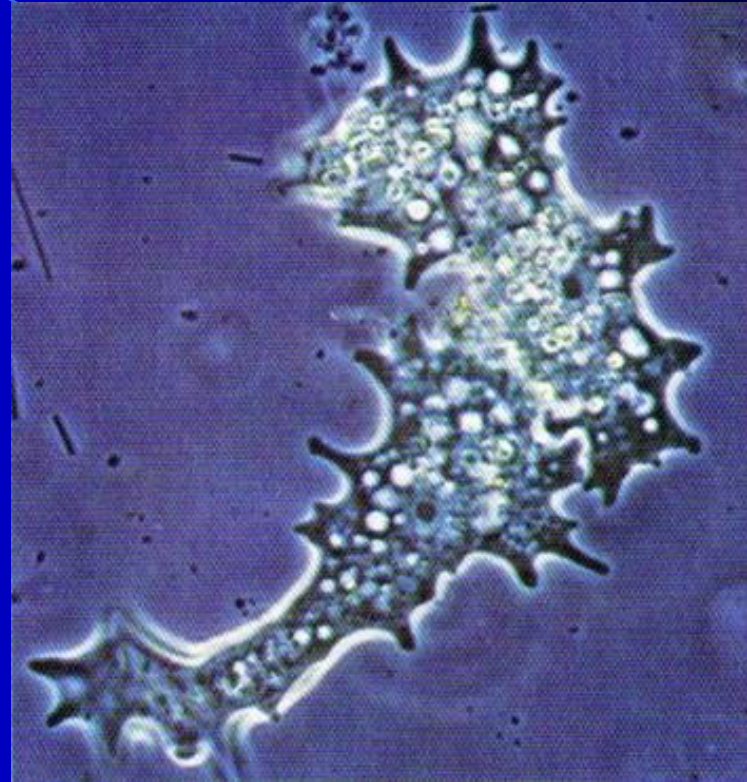


RHIZOPODA

# Famous Rhizopoda



Rhizopoda Testaceae



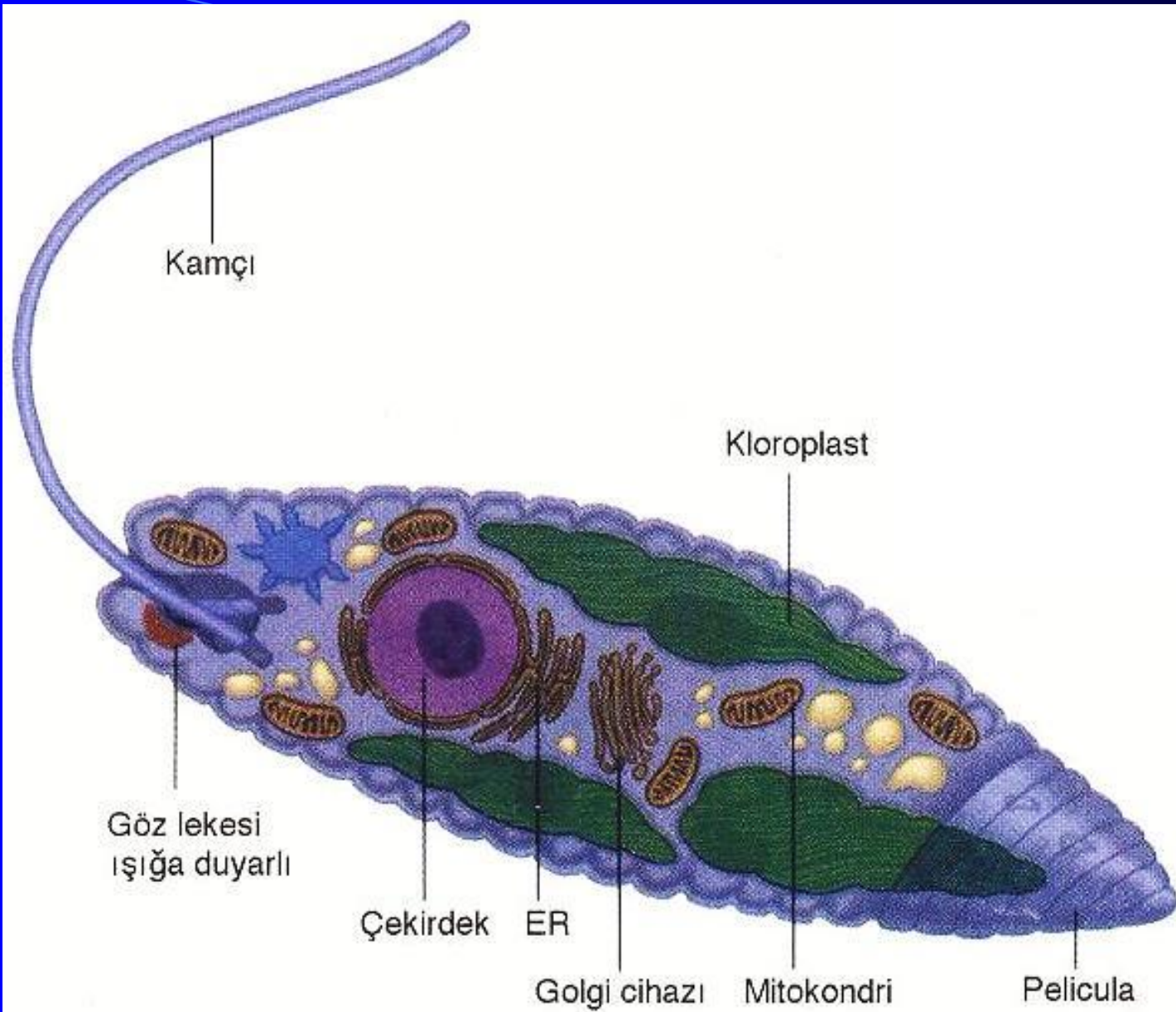
Rhizopoda Amoebina



## **B) Flagellates (protozoan that moves by means of one to several flagella)**

- Organisms in this group move with long thin organs defined as one or more flagellum.
- The variety called *Trypanosoma* is transmitted to humans by a bloodsucking fly and causes sleeping sickness.





**Euglena**



*i) Phytoflagellates*

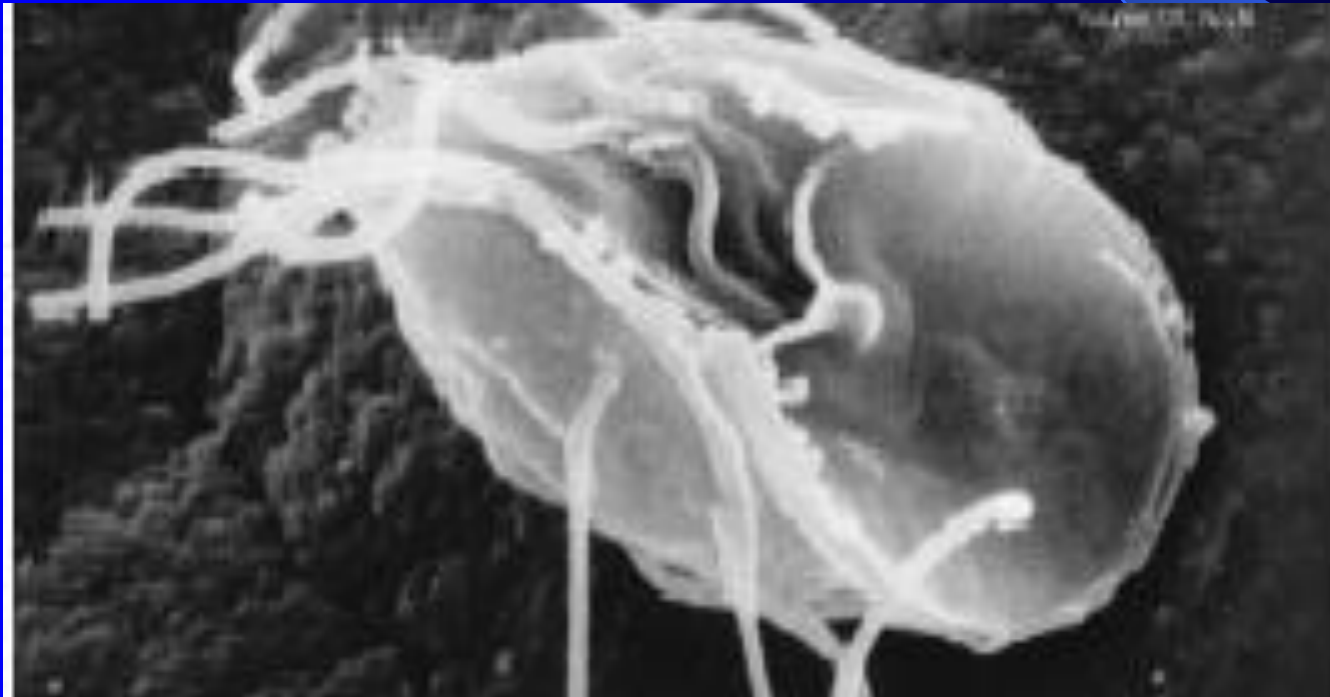
**(photosynthesizing):** They are green, yellow or brown in color and are found in autotrophic forms in the upper soil layers.

*ii) Zooflagellates*

**(heterotrophs) :**

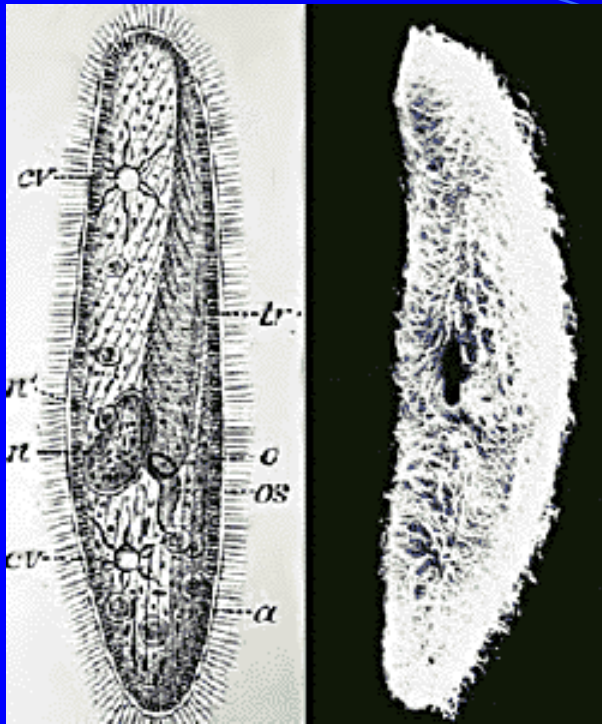
They are heterotrophic organisms that are abundant in soils. As they feed on bacteria, they also benefit from dissolved organic matter.

- The species in the *Polymastigina* group are mostly found in the digestive systems of soil animals such as termites.



## C) Ciliates

- Highly developed protozoa in terms of structure.
- Some species can be large enough to be visible to the eye.
- Covered with eyelash-like organelles called cilia.
- Feed on bacteria, algae, partially fungi and fungal spores as nutrients.
- Pigment formation by bacteria is important in food selection
- Common species *Colpoda*, *Stylonychia Mytilus*



Ciliata



Colpoda



S Mytilus

## **Protozoa in general;**

- They are functional in the release of organical nitrogen and immobile phosphates to soil.
- They are abundant in acid soil conditions i.e. peat forst soils and very active in cellulose decomposition processes.

## A few well-known Protozoa

0 50  $\mu\text{m}$



*Trichonympha* lives  
in the gut of termites



*Trypanosoma gambiense*  
(causes African sleeping  
sickness)



*Euglena viridis*

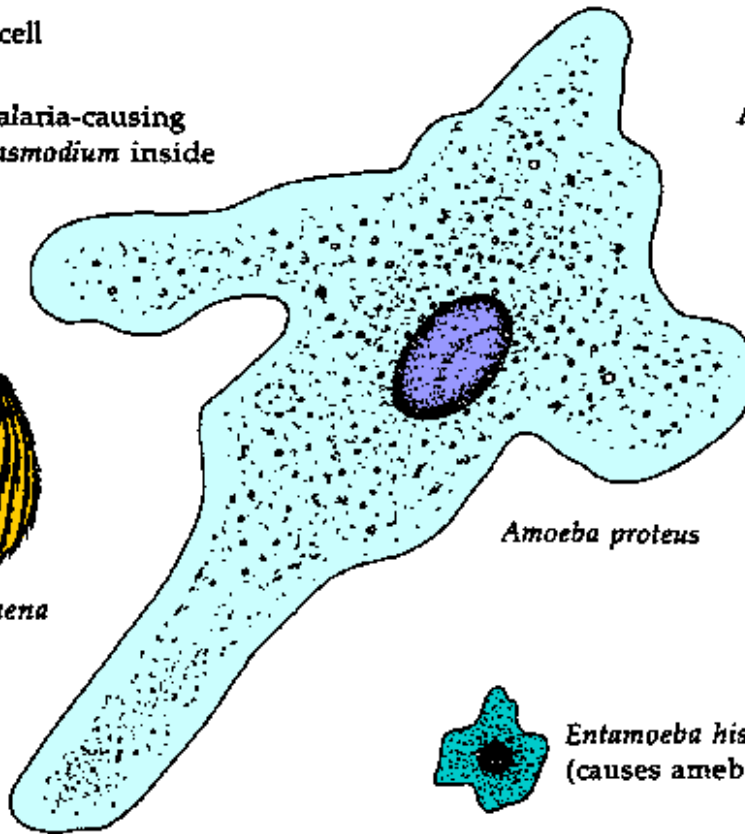
A red blood cell



Malaria-causing  
*Plasmodium* inside



*Tetrahymena*



*Amoeba proteus*

A dinoflagellate



*Entamoeba histolytica*  
(causes amebic dysentery)



# Multicellular soil fauna

The background is a dark blue gradient. A light blue curved line starts from the top left and curves downwards towards the bottom right. A semi-transparent blue shape, resembling a quarter-circle or a wedge, is positioned in the bottom right corner, overlapping the dark blue background.